

CLAIMS

What is claimed is:

1. A method of auditing a communication session between a source connected to a first node of a service network and a destination connected to a second node of the service network, wherein at least one of the source and destination are outside of the service network and are in communication with an interface of the service network, the method comprising:

(a) capturing flow activity of selected traffic outside of the service network between the source and the destination at selected states and points in time during the communication session, including a flow descriptor and corresponding time data for selected datagrams outside of the service network that are intended to be placed in the service network;

(b) capturing flow activity of selected traffic in or at an interface of the service network between the source and the destination at selected states and points in time during the communication session, including a flow descriptor and corresponding time data for selected datagrams placed in the service network; and

(c) using the flow descriptors and their corresponding time data to identify flow activity outside of the service network that corresponds to flow activity in or at an interface of the service network.

2. The method of claim 1 wherein the flow activity captured in steps (a) and (b) further includes total packets for the selected datagrams, the method further comprising:

(d) comparing the total packets of selected flow activity outside of the service network with the total packets in corresponding flow activity in or at a service interface of the service network to perform packet loss data analysis.

3. The method of claim 2 wherein step (d) further comprises comparing the total packets of selected flow activity outside of the service network with the total packets in corresponding flow activity in or at a service interface of the service network to determine at least one of the conditions of: no loss, loss in the service network, loss outside of the service network, and loss inside and outside of the service network.

4. The method of claim 2 wherein step (d) further comprises comparing the total packets of selected flow activity outside of the service network with the total packets in corresponding flow activity in or at a service interface of the service network to determine at

least one of the conditions of: an alternate path into the service network and an alternate path around the service network.

5. The method of claim 1 further comprising:

(d) storing the flow activity outside of the service network in time-stamped flow activity records of one or more external network flow collectors, and storing the flow activity in or at the interface of the service network in time-stamped flow activity records of one or more internal network flow collectors, wherein step (c) is performed using the records in the external and internal network flow collectors.

6. The method of claim 1 wherein steps (a) and (b) are performed by a flow meter.

7. The method of claim 1 further comprising:

(d) determining if selected flow activity captured outside of the service network corresponds to flow activity captured in or at an interface of the service network, and, if so, then the datagrams associated with the selected flow activity captured outside of the service network have successfully passed through the service network, and thus have received a desired service.

8. The method of claim 1 further comprising:

(d) determining if selected flow activity captured outside of the service network does not correspond to any flow activity captured in or at an interface of the service network, and, if so, then the datagrams associated with the selected flow activity outside of the service network may not have passed through the service network, and thus may not have received a desired service.

9. The method of claim 1 wherein ingress and egress flow activity is captured at a service interface in the service network, the method further comprising:

(d) determining if selected flow activity captured outside of the service network corresponds to one, but not both of, ingress and egress flow activity captured at the ingress and egress service interface in the service network, and, if so, then the datagrams associated with the selected flow activity captured outside of the service network may not have passed bidirectionally through the service network, and thus may not have received a desired service.

10. The method of claim 1 wherein ingress and egress flow activity is captured at a service interface in the service network, the method further comprising:

(d) determining if selected flow activity captured outside of the service network corresponds to only some, but not all, of ingress and egress flow activity captured at the ingress and egress service interface in the service network, and, if so, then only some of the datagrams associated with the selected flow activity captured outside of the service network have successfully passed through the service network, and thus may not have received a desired service.

11. The method of claim 1 wherein the flow activity captured in steps (a) and (b) further includes a mathematical representation of the sequence number loss distribution for the selected datagrams, the method further comprising:

(d) comparing the sequence number loss distribution of flow activity captured outside of the service network with the sequence number loss distribution in corresponding flow activity in or at an interface of the service network to detect whether there is a deterministic pattern of missing sequence numbers in the flow activity captured in or at an interface of the service network that indicates that the service network is performing load balancing, and is thus not passing selected traffic through the service network.

12. The method of claim 1 further comprising:

(d) determining if selected source egress and destination ingress flow activity captured outside of the service network corresponds to flow activity captured in or at an interface of the service network, and, if so, then the destination is determined to be reachable from the source via the service network.

13. The method of claim 1 further comprising:

(d) determining if selected ingress and egress flow activity captured outside of the service network corresponds to both ingress and egress flow activity captured in or at an interface of the service network, and, if so, then connectivity is determined to exist between the source and the destination.

14. The method of claim 1 further comprising:

(d) calculating time duration data of the identified flow activity outside of the service network that corresponds to flow activity in or at an interface of the service network; and

(e) using the time duration data to determine one or more round-trip delay parameters.

15. The method of claim 1 further comprising:

(d) calculating time duration data of the identified flow activity outside of the service network that corresponds to flow activity in or at an interface of the service network; and

(e) using the time duration data to determine one or more one-way delay parameters.

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